

seed coat. Seeds of *C. spathulata* appear more dull-surfaced because they are evenly pebbled with minute papillae, and their elaisome is relatively much smaller than that of *C. perfoliata*. These differences are well illustrated by drawings on pages 244 and 248 in *Vascular plants of the Pacific Northwest*, part 2 (Hitchcock et al., 1964).

Plants of the *C. spathulata* group typically occupy fully open sites in sand or gravelly soil, or on mats of moss on bare rocks. Their stems and leaves are usually gray-glaucous. The habitats of *C. perfoliata* include many types of open or shaded conditions and soils ranging from dry and sandy to moist and highly organic. Especially when in shade, plants of *C. spathulata* are green or reddened with betacyanin pigments and are not glaucous. These habitat differences are variable and difficult to quantify and are less useful than seeds or chromosome number in assigning taxa to one or the other of these species complexes.

A long-recognized taxon of Southern California, which botanists have consistently associated with the *C. spathulata* group, is *C. spathulata* var. *viridis* (A. Davids.) Munz. Chromosome counts of three widely separated populations (Table 1) show that it is a tetraploid on a base of  $x=6$ . These plants have a seed morphology similar to that of *C. perfoliata*, and they occur often in shaded habitats and are nonglaucous and green (as the varietal epithet implies). To indicate the natural relationship of this entity to *C. perfoliata*, I propose the following new combination:

***Claytonia perfoliata* Donn subsp. *viridis* (A. Davids.) Fellows, comb. et stat. nov.**—*Montia spathulata* var. *viridis* A. Davids., Bull. S. Calif. Acad. Sci. 5:61. 1907.—*M. exigua* var. *viridis* Jepson, Fl. Calif. 1:473. 1915.—*Claytonia exigua* var. *viridis* v. Poelln., Feddes Repert. Spec. Nov. Regni Veg. 30:306. 1932.—*Limnia viridis* Rydb., N. Amer. Fl. 21:313. 1932.—*C. spathulata* var. *viridis* Munz, Fl. S. Calif. 713. 1974. TYPE: California, San Gabriel Mountains, Big Rock Creek, pine woods, 6 Jun 1906, Hasse & Davidson 1507. Holotype: LAM!.

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NOMENCLATORIAL NOTES ON CLAYTONIA SPATHULATA.—The protologue for *Claytonia spathulata* Dougl. ex Hook. (Fl. Bor. Amer. 1:226. tab. 74. 1832) includes citation of syntypes, "North-West coast of America. A. Menzies, Esq. in Herb. nostr.—In the vallies of the Rocky Mountains, common. Douglas." It appears that no one has yet taken the formal step of designating a lectotype for this name, although various authors have implied that one or the other of the cited collections is the "type". Robinson (in Gray, Syn. Fl. N. Amer. 1:275. 1897) said "... first coll. by Douglas". Rydberg (N. Amer. Fl. 21:313. 1932) gave the type locality as "Rocky Mountains [Canada]". R. S. Ferris (in Abrams, Illus. Fl. Pac. States 2:127. 1944) says simply "Canada". Hitchcock (Vas. Pl. Pac. N. W. 2:246) states, "Menzies, 'North-West coast of America,' is the first of two collections cited". Through the courtesy of the Royal Botanic Gardens, Kew, we have examined the type sheet of *C. spathulata* from the Hooker Herbarium (photograph, OSC), and we would like to present the following comments regarding typification of this name.

The top three individuals on the sheet in *Herbarium Hookerianum* are associated with a field label by David Douglas, which reads, "*Claytonia spatulata* (sic!) D. D. In the vallies of the Rocky Mountains. Common." On the sheet beside this label, Hooker (we assume) has written the phrase "v. *C. exigua* Torr. & Gr.". Above the specimens there is written, anonymously, "These are the plants illustrated and described as *C. spathulata*." In the middle of the sheet are two other collections; one is a single rather fragmented and depauperate individual beneath which is written (presumably by Hooker), "'*Claytonia*.' Sandwich isles. A. Menzies. (or N. W. C of Am)". To the right of this is a very robust individual, by which Hooker wrote, "*C. spathulata*  $\beta$ . Douglas California". At the bottom of the sheet are two less robust plants, without collector or locality, bearing Hooker's annotation, "*C. spathulata*  $\gamma$ . v. etiam *C. gypsophiloides*".

We propose that the largest of the three plants in the Douglas collection labeled "In the vallies of the Rocky Mountains" be designated as the lectotype of *Claytonia spathulata*. These plants match very well both the description and the illustration given in the *Flora Boreali-Americana*, whereas Menzies' plant (although undoubtedly representing the species *C. spathulata*) is in poor condition and bears two alternative locality designations. That the name itself was suggested by Douglas, in manuscript, is also pertinent. It is interesting that in neither the drawing nor the written description is there a mention of any connation between the cauline leaves of *C. spathulata*, although in the Pacific Northwest it is usual for plants of this species to show some such fusion. Careful examination of the lectotype indicates that the leaves are fused on one side for a distance of about 0.5 mm, and on Menzies' plant, one leaf pair shows 1 mm of fusion.

Through the kindness of the Director, Royal Botanic Gardens, we received permission to make a pollen preparation of the lectotype plant of *C. spathulata*. This slide, which is on file at Kew, shows that most of the grains have irregular aperture patterns of a syncolpate type. Most common is the occurrence of two annular colpi encircling opposite poles of the grain, these colpi often being cross-connected by one or two colpi on one side. Tricolpate and hexacolpate grains are also present. Nilsson (*Grana Palynologica* 7:229. 1967) stated that *C. spathulata* "is in reality 3-colpate, but it often has grains with an irregular number of colpi". Our own studies of *C. spathulata* pollen indicate that in the diploid types the grains are regularly 3-colpate, but that in the hexaploid type ( $2n = 48$ ) that is common in the Pacific Northwest, irregularly syncolpate grains occur that are like those seen from the lectotype. Palynological evidence suggests, therefore, that the lectotype represents a polyploid form of the species.

It is a puzzle as to exactly where Douglas made his collection of *C. spathulata*, since as far as we can determine, the logical choices—namely, the valleys of the upper Columbia River, in what are now the Canadian Rockies—are outside the range of this taxon. Douglas would have encountered the plant on the coast and along the lower Columbia River to perhaps as far east as what are now Gilliam and Morrow Counties, Oregon. One might speculate that Douglas meant the Cascades, rather than the Rockies, or that he was referring to the Blue Mountains, which he visited on a trip south out of Walla Walla. We cannot offer any good answer to this question.

The collection by Douglas, from California, that Hooker annotated as "*C. spathulata*  $\beta$ ." is the holotype of the taxon *Claytonia spathulata* var. *major* Hook. & Arn. (Bot. Beech. Voy. 344. 1839), a name that has been almost universally overlooked in the synonymy of this species (the only citation we found is in the Gray Herbarium Card Index). The type is a robust plant with very numerous linear leaves, lanceolate cauline leaves that are 10–18 mm long and connate on one side up to 5 mm, and petals that are up to 5 mm long. A probable isotype is at CGE.

In the Botany of Beechey's Voyage (loc. cit.) Hooker and Arnott described a third variety of *C. spathulata*, making a combination that also has been overlooked by most later bibliographers: *Claytonia spathulata* var. *exigua* (T. & G.) Hook. & Arn., based on *C. exigua* of Torrey and Gray (Fl. N. Amer. 1:200. 1838), the type being a collection by Douglas from California. As recently as 1974, Munz (Fl. So. Calif. 713) attributed this combination to Piper (Contr. U. S. Natl. Herb. 11:250. 1906); however, the infraspecific combinations made by Piper in his Flora of the State of Washington are better treated as being subspecies (note, for example, on p. 572, "*Aster campestris suksdorfii* subsp. nov.")—CHARLES E. FELLOWS and KENTON L. CHAMBERS, Department of Botany, Oregon State University, Corvallis 97331.

EMPETRUM HERMAPHRODITUM (EMPETRACEAE) IN HUMBOLDT COUNTY, CALIFORNIA.—A small population (ca 8 m<sup>2</sup>) of *Empetrum hermaphroditum* (Lange) Hagerup was recently discovered along the coast of Humboldt County within Trinidad Beach State Park, 29 Mar 1975, *G. S. Lester 600* (HSC); 4 Apr 1975, *G. S. Lester 604* (RSA, CAS, JEPS, UC). The plants are growing at Megwil Point on Elk Head just N of Trinidad (22 km N of Eureka). Here *Empetrum* forms thick, distinctive dark green mats and occupies the NW facing portion of a standstone bluff with regionally abundant shrubs, *Vaccinium ovatum* Pursh, *Gaultheria shallon* Pursh, and *Garrya elliptica* Dougl. This locality is 81 km S of Point St. George, Del Norte County, the only recently known *Empetrum* site in California. Intensive surveys over the last two years suggest that *Empetrum* has been extirpated in the Point St. George region.—GARY S. LESTER, Department of Biology, Humboldt State University, Arcata, California 95521.

VASCULAR PLANTS OF MONTANE CONIFEROUS FOREST IN SAN BERNARDINO MOUNTAINS, CALIFORNIA.—In our work on the impact of oxidant air pollution we established a series of eight riparian zone transects and 101 upland plots in the montane coniferous forest of the San Bernardino Mountains. Three hundred thirty-seven species of vascular plants representing 224 genera and 55 families were collected from these transects and plots. Three hundred fifteen of these were native and twenty introduced. Twenty-six species are endemic to the San Bernardino Mountains and fifteen are considered as rare or endangered by the California Native Plant Society. This collection includes 83 species not listed in Parish's (*Plant World* 20: 208–223. 1917) enumeration of the flora of the San Bernardino Mountains and three species not previously reported by Munz (*A flora of Southern California*. 1974) as occurring in Southern California. Voucher specimens are preserved in the herbarium of the Department of Forestry and Conservation, University of California, Berkeley.

A list of taxa collected in this study and including those listed by Parish, but not collected by us, may be obtained from the Department of Forestry and Conservation, 145 Mulford Hall, University of California, Berkeley, CA 94720. This list contains habitat information and indicates which taxa are introduced.—JOE MCBRIDE, TANA HILL, RANDY MILLIKEN, and NIKKI LAVEN, Departments of Forestry & Conservation and Conservation of Natural Resources, University of California, Berkeley 94720.